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#### What is PaOneStop? (www. PaOneStop.org)

- Pa One Stop provides online tools to help farmers meet regulatory requirements for Conservation (Ag E&S) and Nutrient Management Planning
- Consists of modules:
  - <u>Farm Mapping Module</u> allows farmers to develop maps that are required for Nutrient Management Planning, Nutrient Balance Sheets, Manure Manure Management Plans, AgE&S Plans
  - Ag E&S Module allows farmers to develop AgE&S Plans to reduce soil loss and protect water quality
- Manure Management Planning prototype module under development.





## Who is developing PaOneStop?

- Pa One Stop is being developed by Penn State Cooperative Extension in collaboration with and support from:
  - Pa State Conservation Commission
  - Pa Dept of Environmental Protection
  - Pa Dept of Agriculture
  - Pa Dept of Environmental Protection
  - USDA Natural Resources Conservation Services
  - Chesapeake Bay Foundation
  - National Consortium for Rural Geospatial Innovations in America





## Farm Mapping Module

- Pa regulations require completion of Nutrient Balance Sheets for manure transfers, Nutrient Management, Manure Management, and Ag E&S Plans for farms
- Methods to complete Nutrient Balance Sheets, MMPs, and NMPs are available to farmers but require maps as part of the process.
- Maps are expected to contain field boundaries, acreages, stream and water features, wells, sinkholes, application setbacks and buffers, soils, aerial images and more.
- Production of maps is difficult for most farmers and costly





#### www.paonestop.org



#### PAOneStop Farm Mapping and E&S Planning System

PENNSTATE



Cooperative Extension College of Agricultural Sciences

#### Site Links

- Begin Mapping
- · PAOneStop Home
- Need For PAOneStop
- Your Information is Secure
- o 6 Easy Steps
- Who Supports PaOneStop?
- o Benefits & Features
- Download Fact Sheet

Welcome to the PAOneStop.org Website!

#### \*Start Mapping Now

(PAOneStop is optimized for Mozilla Firefox. This is a free download. Get firefox now.)

#### About PAOneStop

PAOneStop provides online tools to help farmers meet regulatory requirements for Conservation and Nutrient Management Planning. Development of PAOneStop is ongoing and will be released to the public incrementally.

The first module of PAOneStop is a Nutrient Management Mapping Module. This module provides a tool to extract data and generate high quality maps that are required for completion of Nutrient Balance Sheets and Nutrient Management Plans.



The second module within PAOneStop, and currently under development, will provide tools to assist farmers in developing Conservation Plans (erosion and sedimentation, E&S) to meet regulatory requirements, reduce soil loss, and protect the water quality.

#### Who is Supporting PAOneStop?

PAOneStop is being developed by Penn State Cooperative Extension Land Analysis Lab in collaboration with and support from:

PA State Conservation Commission









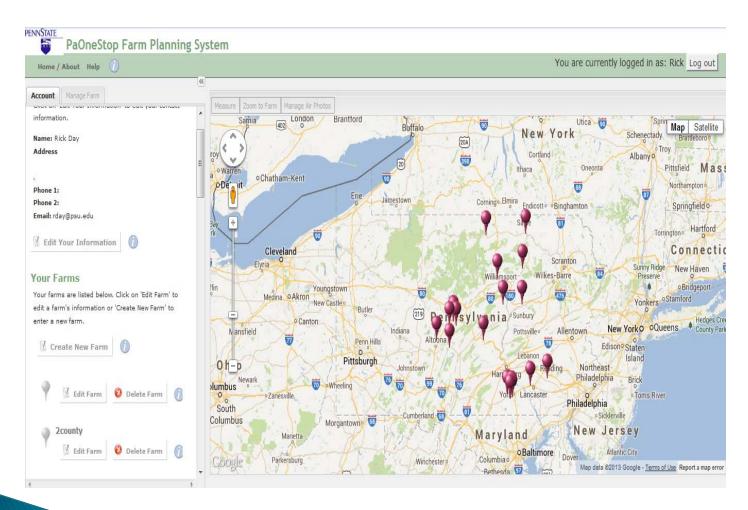
## Create User Login



- Username
- Password
- Data secured and not shared
- Data stored on server for future access and editing



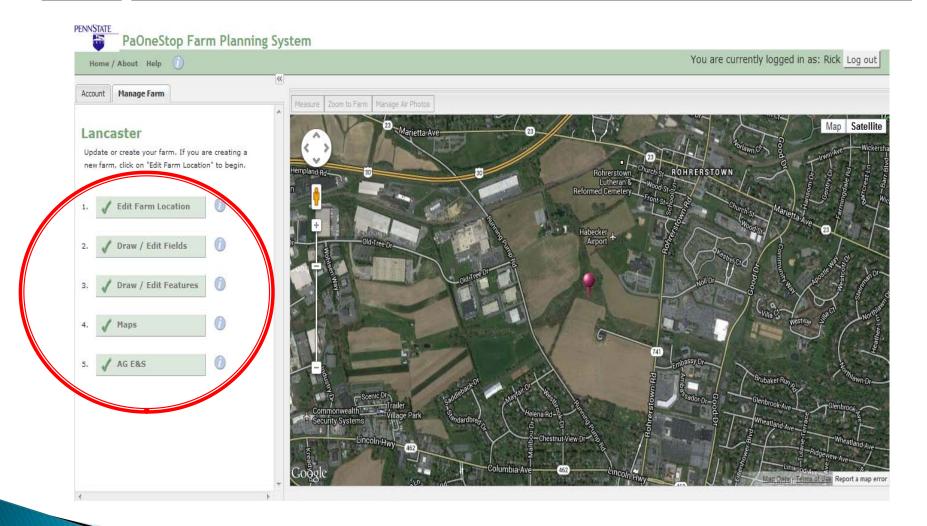
#### **User Accounts**



- Locate farm using address and Google maps
- Map as many farms as you like



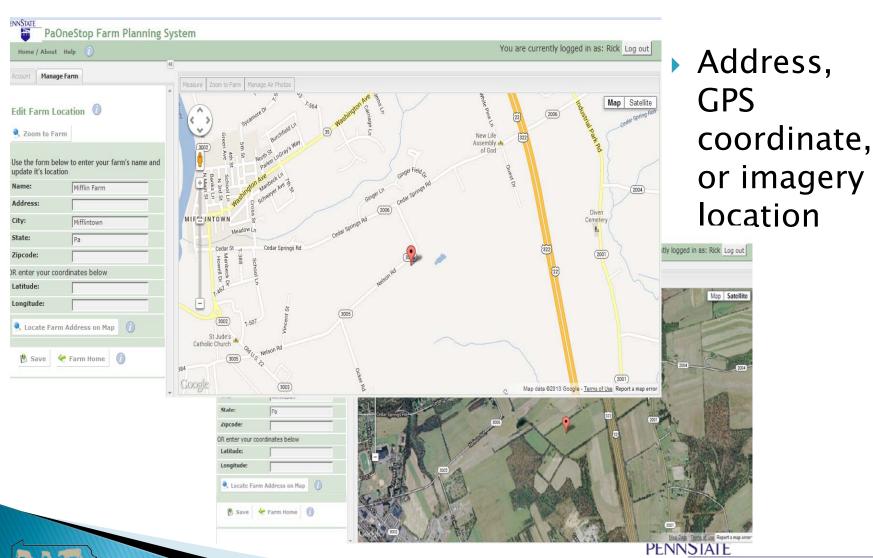
## Mapping and Planning - 5 steps



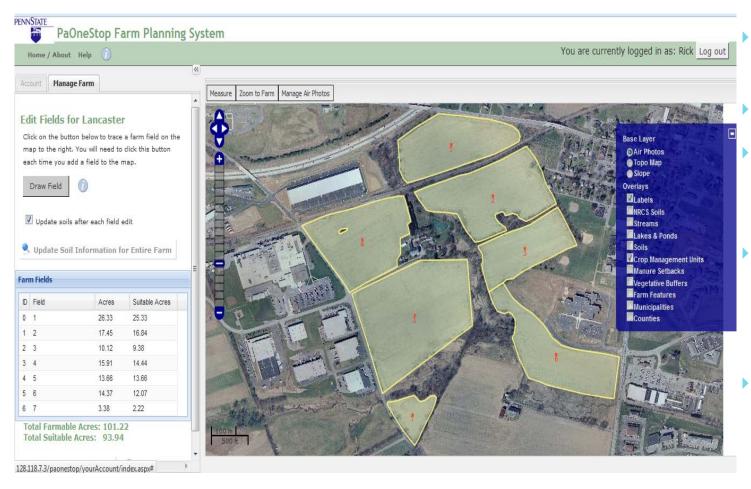




## Step 1: Locate Farm



## Step 2: Draw and Label Fields



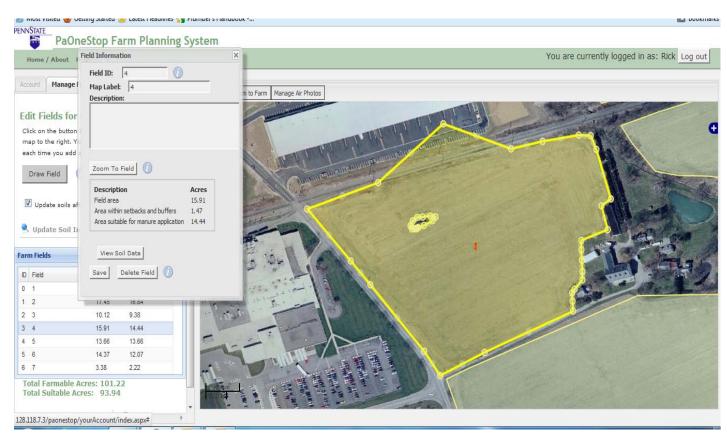
Outline field boundaries

Describe fields

- Acreages automatically calculated
- Fields can be added, edited, or deleted as needed.
- Air photo background automatically provided



#### **Edit Fields**

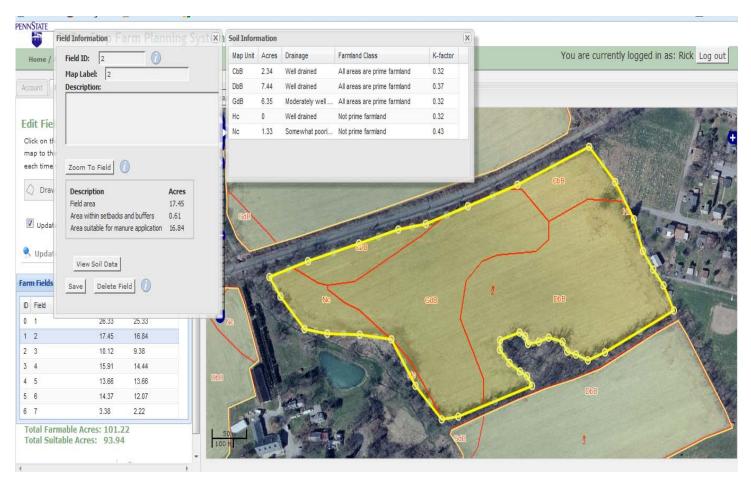


Field boundaries can be edited and resaved

Errors can be deleted



#### **Extract Soils for Fields**



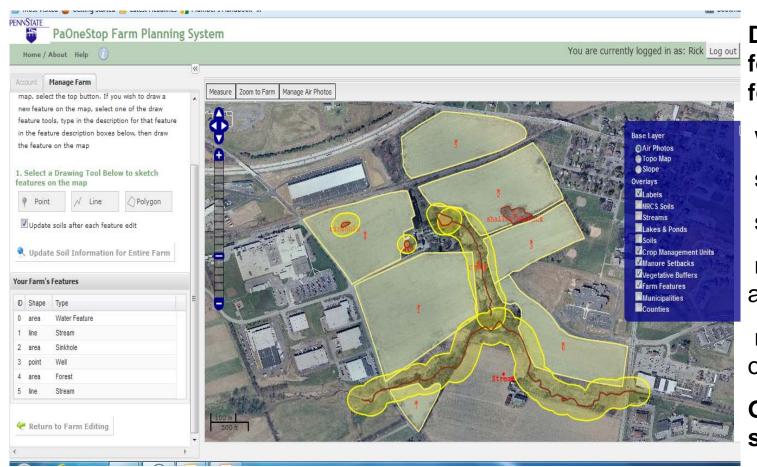
USDA-NRCS SSURGO soils data extracted via web for each field

soil types soil properties acreages

updated after each field edit automatically



## Step 3: Draw Farm Features



Draw other farm features needed for map

water wells

sinkholes

streams

manure staging areas

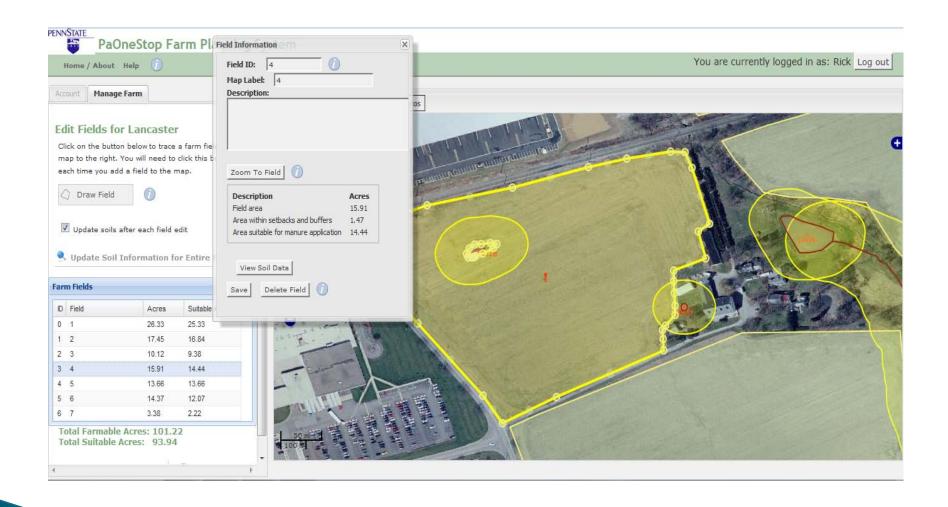
non-farmed areas of fields

**Generate Manure** setbacks

**Generate Buffers** 



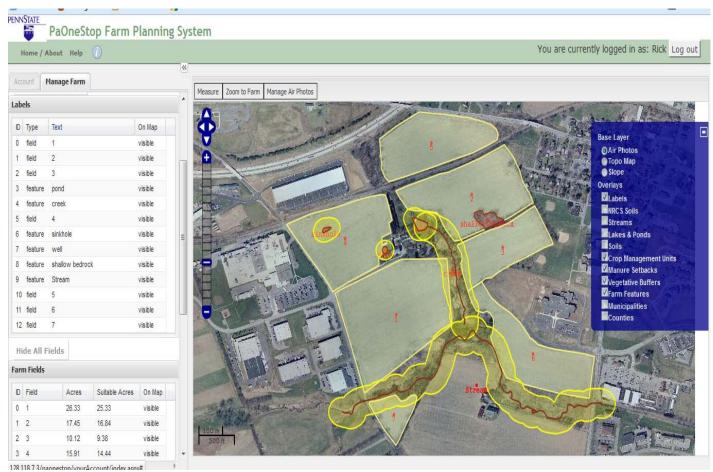
## Determine Unsuitable Acreages







## Step 4 : Create Maps



Select features to appear on map

Only impacted fields need to be mapped

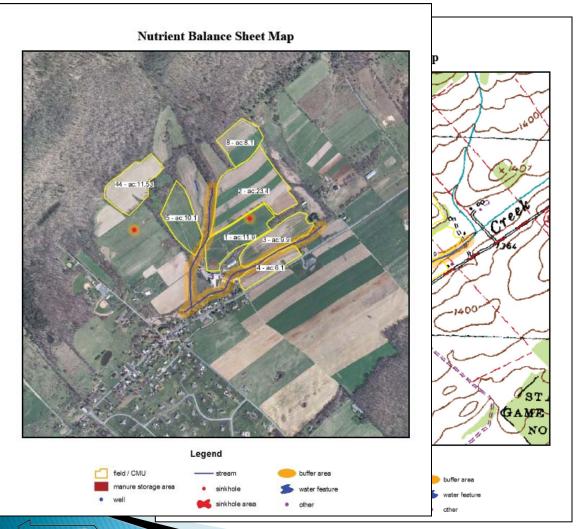
Hide any field or feature not needed for map

Select background for map

- air photo
- topography



## Generate Maps



- PaOneStop
   generates maps on
   air photo or
   topographic base
   maps
- Farmers can save maps for reference
- Farmers can save farm data for future mapping
- Only need to draw fields and farm features once





## Example User Map







#### AgE&S: Chapter 102 Requirements

- written E&S Plans for all "agricultural plowing and tilling activities" greater than 5,000 square feet that must:
  - limit soil loss from accelerated erosion to the soil loss tolerance (T) over the planned crop rotation
  - contain additional BMPs for fields within 100 feet of river or perennial or intermittent stream and less than 25% plant or residue cover
  - contain plan maps that show the location of features including surface waters of this Commonwealth, and drainage patterns, field and property boundaries, buildings and farm structures, animal heavy use areas, roads and crossroads, and BMPs; soils maps; and a description of BMPs including animal heavy use area practices and procedures, tillage systems, schedules, and crop rotations
  - contain an implementation schedule
  - be available for review and inspection at the agricultural operation





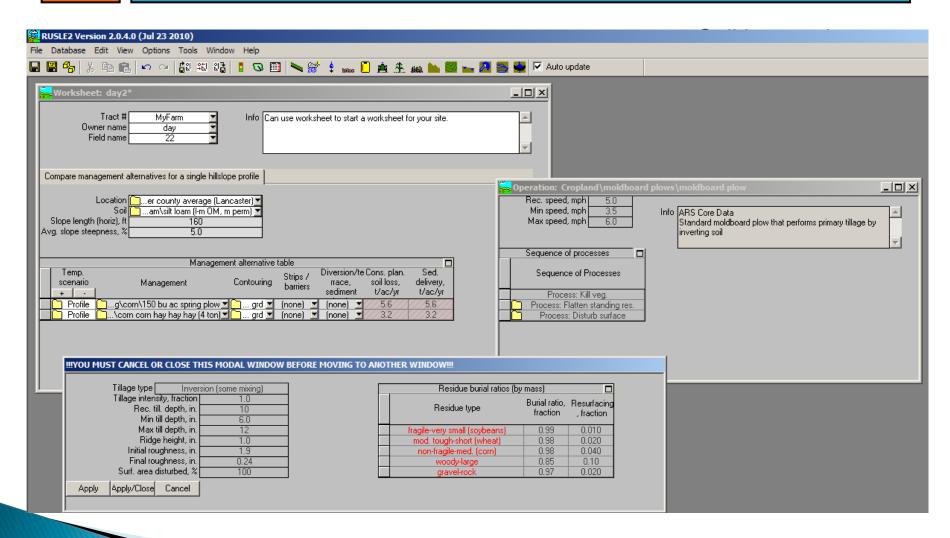
## How PaOneStop AgE&S works

- Map fields using existing PaOneStop tools
- Determine soil loss for each field using RUSLE2 model linked to PaOneStop
  - A=R x K x LS x C x P
  - Extract soil, topography, climatic conditions from online databases
  - Collect crop management information from user (crops, rotations, tillage, BMPs (contouring, terraces, strips, etc)
- Compare soil loss to NRCS tolerable soil loss values (T)
- Modify crop management and/or implement conservation practices necessary to achieve tolerable soil loss for each field.
- Store farm information online for future modification or access
- Print reports and maps summarizing the Conservation Plan
- Submit Conservation Plan to regulatory agencies for review





## RUSLE2 - Too many options !!!







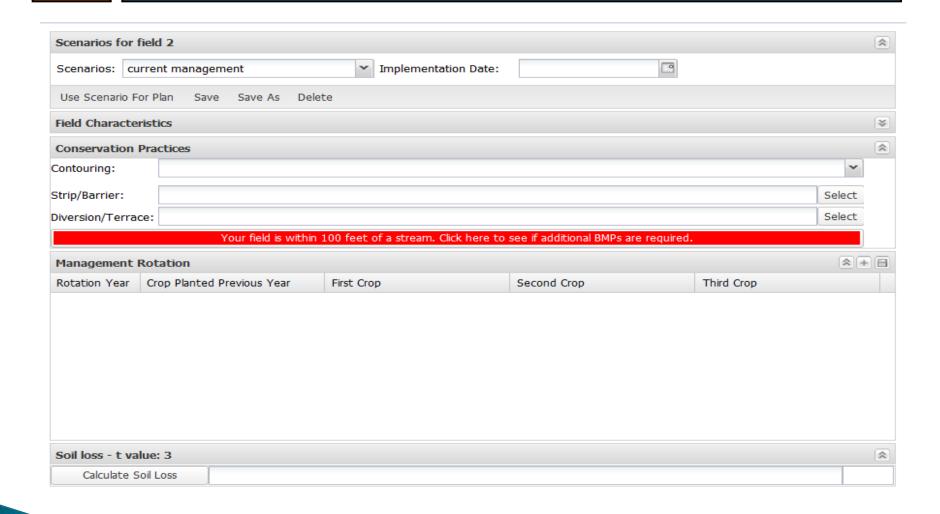
## Simplified RUSLE2 Options

- County -climate
- Field soil
- Rock content
- Slope/length
- Crop Management
  - crops
  - Tillage methods
  - Single crop and rotations
  - crop yield
  - manure applications
  - planting date
- BMPs:
  - Contouring
  - Buffers/ Strips/Barriers
  - Diversions/terraces/basins/ditches





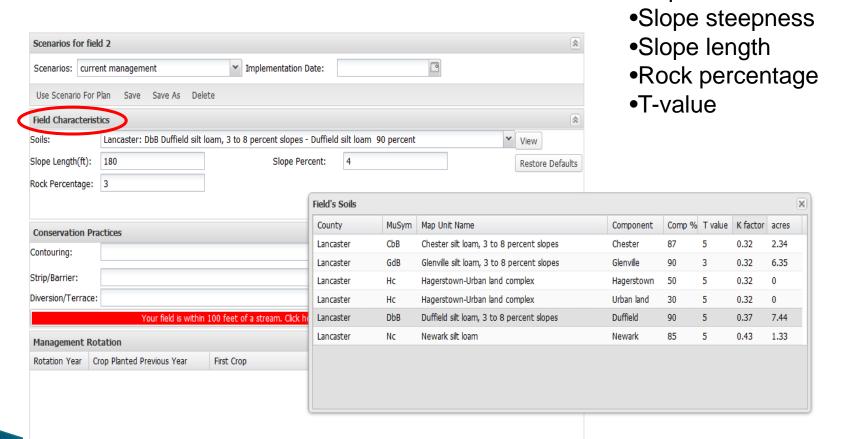
#### AgE&S: Field Management Interface







#### Field Characteristics - defaults





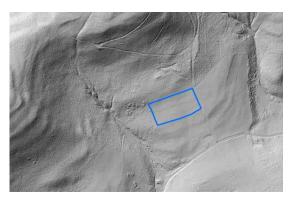
Representative soil

## Field Slope - LiDAR

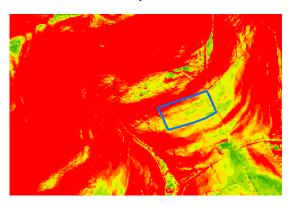
Field Boundary

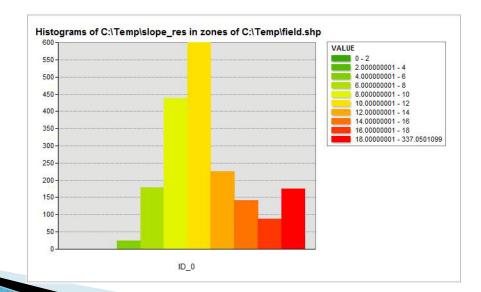


Lidar Elevations



**Lidar Slopes** 





Default slope based on statistical distribution of slope within field (75<sup>th</sup> percentile)

User may override default





## Field Slope Length

Slope length is one of the least sensitive input parameters to RUSLE2 and one of the most difficult to determine....even in the field.

Initially slope length will be based on a simple relationship with slope that has been developed and used by USDA-NRCS

<u>slope</u>	<u>length</u>
3%	200 ft.
8%	130 ft.
15%	70 ft.

Slope length most important to soil loss on steep slopes

Later versions will add optional methods to determine slope length

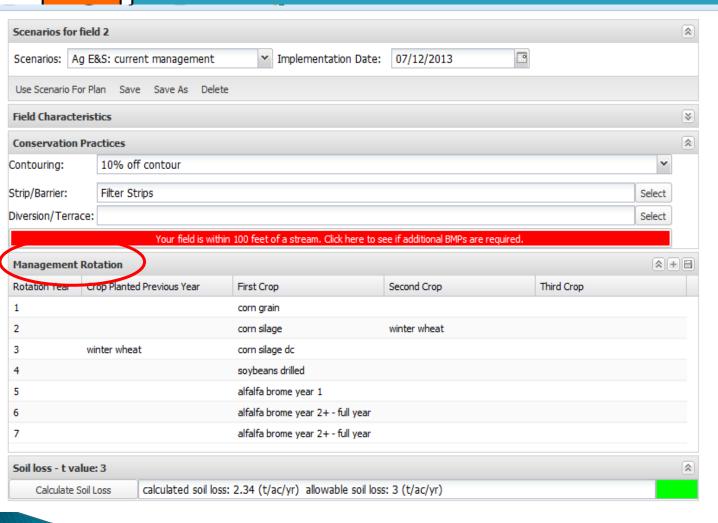
- developed relationship from existing Conservation Plans
- GIS / terrain analysis methods

User may override default





## Crop Rotation and Management



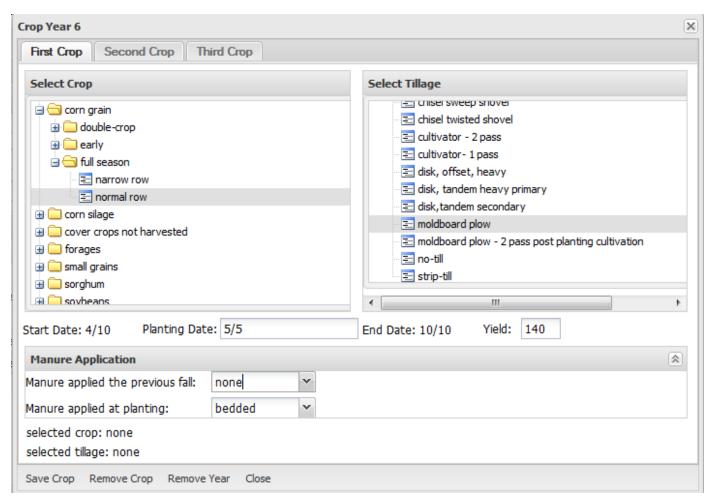
Multi-year rotations

Copy rotations from one field to another

Edit as needed



#### Crop Rotation Builder

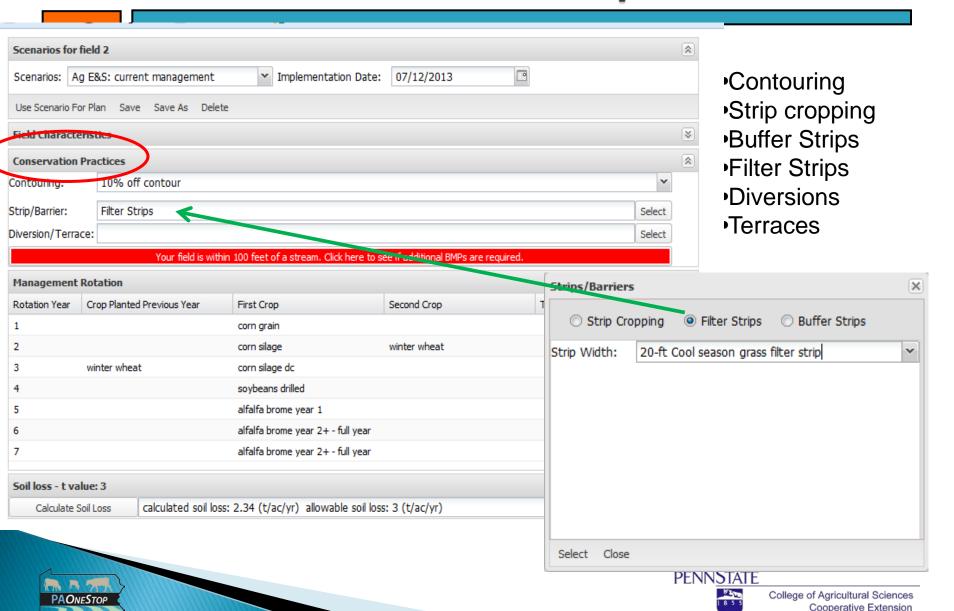


#### **Yearly Options**

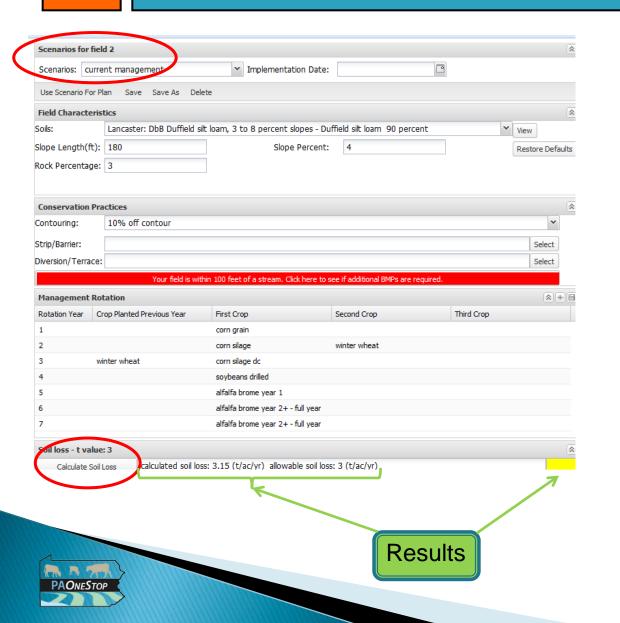
- 2 main crops
- Cover crops
- Tillage method
- Planting date
- Yield
- Manure app.



### BMPs - conservation practices



## Multiple Scenarios



Start with current management

Calculate soil loss

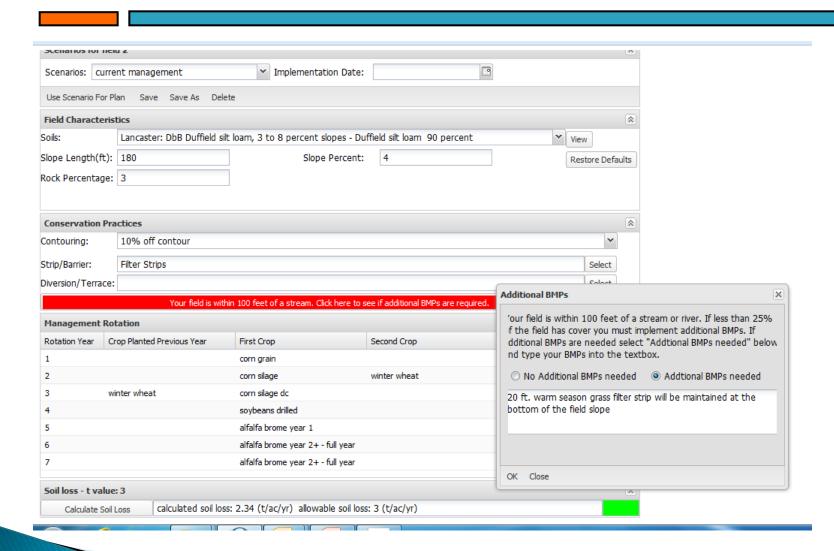
If acceptable
Use for Ag E&S plan

If not acceptable
create new scenario by
modifying
management practices
until acceptable

Can save many scenarios but only have one for Ag E&S plan

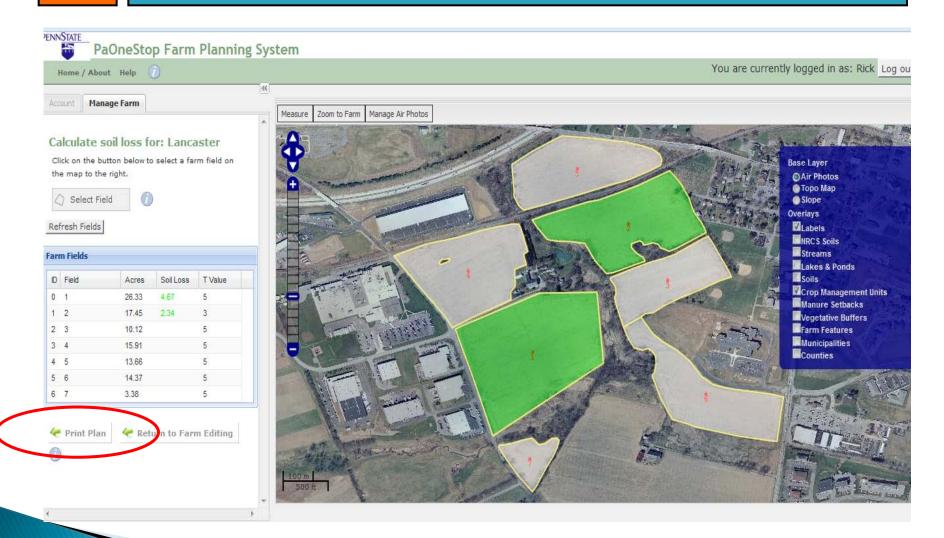


#### Sensitive Areas - 100 ft. to stream





## AgE&S - Print Report









## AgE&S Plan

- Printed plan on demand, including:
  - Plan Summary Checklist
  - Field by field management information
  - Soil loss calculations
  - T-values
  - Implementation schedule per field
  - mapping
- Data stored online for future retrieval

#### Chapter 102 Agricultural E Plan Summary Agricultural E plan for(Owner/Operator)

Addres	s
Agricul	tural E plan preparer
Date of	pian
The att	ached Ag E plan includes the following elements:
	BMPs on plowed and tilled cropland ensure that soil loss does not exceed the soil loss tolerance (T) I for the planned crop rotation(s)
	Additional BMPs to minimize accelerated erosion and sedimentation for fields within 100 feet of a stream, that have less than 25% plant cover or crop residue cover
	BMPs to minimize accelerated erosion and sedimentation from animal heavy use areas. These BMPs may include Heavy Use Area Protection, Critical Area Planting, Fencing, Wastewater Treatment Strip, Constructed Wetland, Use Exclusion, Animal Trails and Walkways, Diversions and Roof Runoff Structure and/or others
	An implementation schedule describing when (season and year) the planned BMPs will be implemented, installed, and operational
	Operation and maintenance criteria describing how BMPs will be operated and maintained throughout the

Maps that show the location of features consistent with the current and planned conditions on th farm, including :

Yes	
	surface waters and drainage patterns (topographic map)
	field and property boundaries
	buildings and farm structures
	animal heavy use areas
	roads and crossroads
_	existing and planned BMPs
	soils map

Created by the Penn State Geospatial Technology Program, Land Analysis Lab.

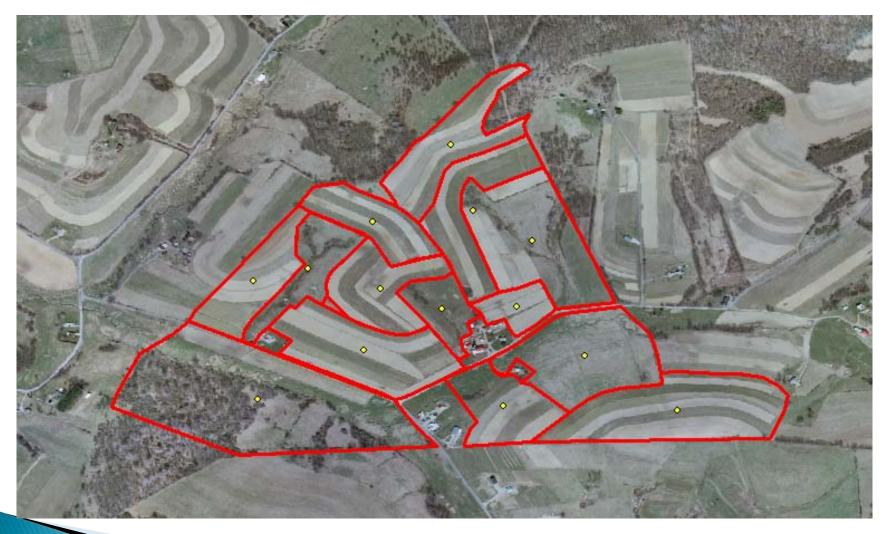
http://www.paonestop.or

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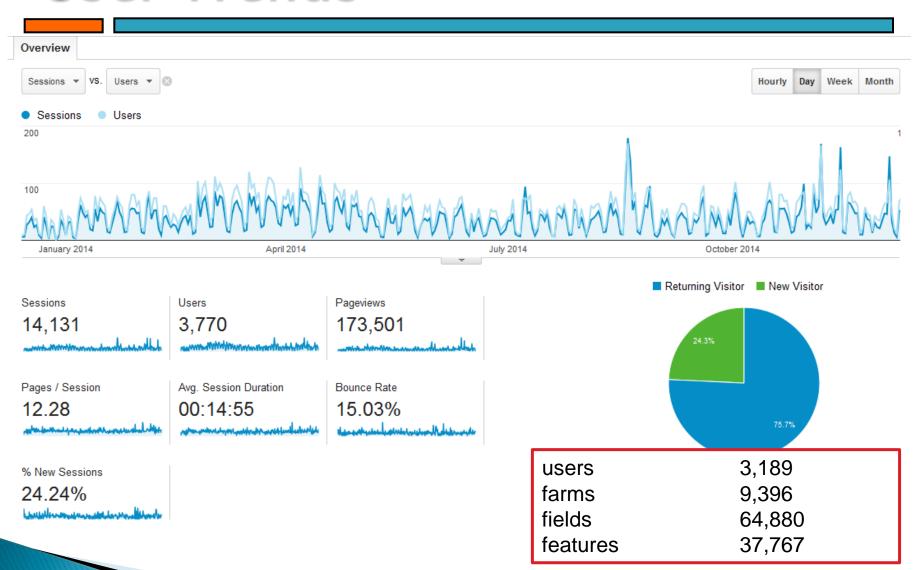
#### **Real User Data - Example**







#### **User Trends**







#### PaOneStop Training

- AgE&S Statewide Deployment April 2014
- Training Completed (5.0 CECs) "hands-on"
  - DEP SW Region Pittsburgh, PA Aug 20 (20 students)
  - DEP NE Region Wilkes–Barre, PA Aug 28 (16 students)
  - SCC NMEP Stormwater/Soil Loss Workshop Oct 8 (11 students)
- NMEP Training Completed (5.0 CECs) "hands-on"

Oct 30, 2014 Mercer

Nov 6, 2014 Gettysburg

Nov 14, 2014 Lewisburg

Dec 4, 2014 Lancaster

- Upcoming Training
  - Dec 28 State College (5.0 CEC) -
  - 4-6 more regional "hands-on" trainings through 6/30/2014 (not scheduled)





PaOneStop "Hands-On" Training







#### PaOneStop Outreach

- Crops Conferences Penn State Extension
  - Lancaster Crops Conference 1/15/2015
  - SEPA Crops Conference 1/21/2015
  - Central PA Crops Conference 1/30/2015
  - NEPA Crops Conference 2/10/2015
- Crops Field Days Penn State
  - 16 events
  - Blair, Lebanon, Franklin, York, Perry, Potter, Clearfield, Somerset, Butler, Mercer, Tioga, Schylkill, Elk
  - Jan March 2014
- Miscellaneous Events conferences, meetings, newsletters, press releases, fact sheets, ....





#### **Future Enhancements**

- Advisory Team state/federal agencies, industry, Extension
- System Functionality
  - Copy farm tool
  - Transfer farm to another user tool
  - Better Imagery Google, Bing, NRCS
  - Better topography USGS
  - Row grade calculator LiDAR calculated
  - Variable buffer sizes on different sides of line
  - Document changes made to "default" field properties
  - Field divide tool
  - AHUA mapping enhancements
  - Pasture erosion
  - NWI wetlands, HQ/EV streams layers
  - Rotation Builder more crops, managements, operations (ex. Vertical tillage)
- Software and database security enhancements
- Annual soil loss for nutrient management
- New RUSLE2 version
- Update NRCS SSURGO soil databases
- Assess impact of Chapter 102 on farming practices
- User Evaluations surveys, data analysis, field data collection

Manure Management Module - prototype developed but no funding to complete





# Thank You

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www.paonestop.org



